

WHAT IS CLAIMED IS:

1. A superconducting coil system comprising a superconducting coil and a normal conducting coil, the normal conducting coil having a current time constant ( $L_2/R_2$ ) which is larger than  $L_1/R_1$ , or the time constant at which the current through the superconducting coil decays rapidly after the conductors in the superconducting coil made a transition to the normal conducting state, in which  $L_1$  and  $L_2$  represent the self-inductances of the superconducting coil and the normal conducting coil, respectively,  $R_1$  represents the resistance for causing rapid decay of the current flow through the superconducting coil, and  $R_2$  represents the resistance of the normal conducting coil.
2. The superconducting coil system according to claim 1, wherein the coefficient of electrical coupling between the superconducting coil and the normal conducting coil is at least 50%.
3. The superconducting coil system according to claim 1 or 2, wherein the superconducting coil is fabricated of cable-in-conduit conductors.
4. The superconducting coil system according to any one of claims 1-3, wherein the normal conducting coil is fabricated of copper, aluminum or other metal conductors of low resistance.